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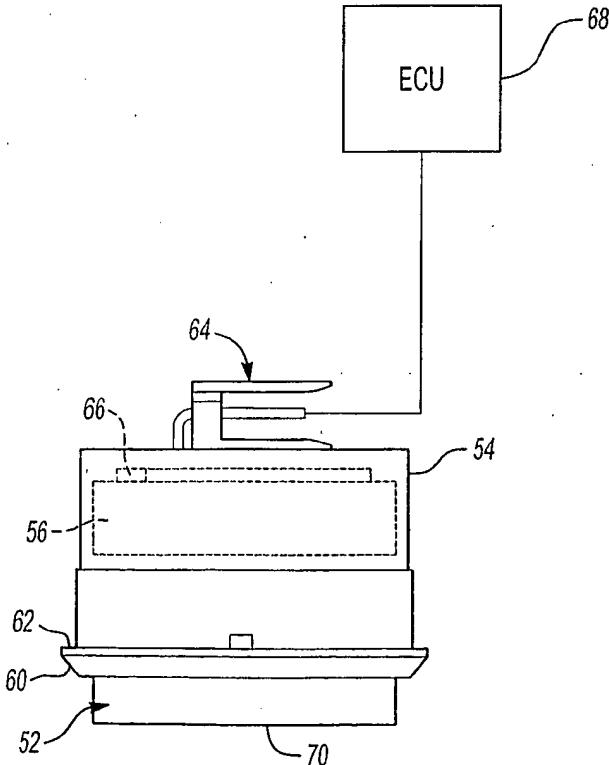
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[Continued on next page]

(54) Title: ELEVATOR CALL BUTTON WITH TACTILE FEEDBACK



(57) Abstract: An elevator call button assembly (20) includes at least one call button (50) having a surface (70) that is touchable by an individual to indicate a desired call in the elevator system. A responder (56) provides a tactile indication that the call has been successfully placed. In one example, the responder (56) comprises a vibrating motor that moves a moveable member (52) once the system controller (68) has successfully received a signal indicating the desired call.

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ELEVATOR CALL BUTTON WITH TACTILE FEEDBACK**1. Field of the Invention.**

5 This invention generally relates to call buttons for elevator systems. More particularly, this invention relates to providing tactile feedback indicating a successful call.

10 2. Description of the Related Art.

Elevator systems typically include a car that travels to various landings within a building for transporting passengers or cargo between levels of the building. At each landing there typically are call buttons that are accessible for an individual to send a signal indicating a desire to have the car stop at that landing. Additional call 15 buttons are provided within the car in a car operation panel that allows an individual to select a particular floor level, for example, to which the elevator car should take them.

Call button activation sends a signal to the system controller, which 20 responsively controls movement of the elevator car according to the received signal (i.e., bringing the car to a particular landing or taking the car to a particular floor level). Some calls buttons include a light feature that lights up when the button has been activated. This provides a visible acknowledgement to an individual that their call has been received by the controller and that they can expect the elevator system to service them as desired.

25 Some call button arrangements provide a sound upon call button activation. A “beep,” “chime” or “ring” type of noise provides audible feedback to an individual that their call has been successfully placed.

30 While such arrangements have proven useful, there are situations where they are not adequate. The lighted arrangements do not provide any feedback to an individual who is blind or visually impaired, for example. The sound-emitting arrangements do not provide any feedback to a deaf or hearing impaired individual. Additionally, those skilled in the art are constantly striving to make improvements in

the effectiveness of various aspects of elevator systems. There is a need for an improved arrangement that provides an indication to a wider variety of individuals that their call has been successfully placed and that they can expect the elevator system to service them as desired. This invention addresses that need.

5

SUMMARY OF THE INVENTION

In general terms, this invention is an elevator call button device that provides tactile feedback indicating that a desired call has been placed.

One example device designed according to this invention includes a surface 10 that is manually touchable to indicate a desired call. A responder automatically provides a tactile confirmation of the desired call.

In one example the touchable surface is supported on a moveable button member that is manually moveable to indicate the desired call. In one example the responder comprises an automated mover that automatically moves the moveable 15 member to provide the tactile confirmation.

In one example the tactile confirmation is provided by a vibrating motor supported as part of the call button arrangement.

A method of acknowledging that a call button signal has been received in an elevator system according to this invention includes providing a tactile confirmation 20 at the call button upon successful receipt of the signal.

The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiments. The drawings that accompany the detailed description can be briefly described as follows.

25

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 diagrammatically illustrates selected portions of an elevator call button assembly designed according to an embodiment of this invention.

Figure 2 diagrammatically illustrates selected portions of an alternative 30 embodiment.

Figure 3 diagrammatically illustrates selected portions of a call button arrangement designed according to this invention that is useful in a car operating panel.

Figure 4 is a perspective, exploded view schematically illustrating one 5 example embodiment of a call button designed according to this invention.

Figure 5 is a side, elevational view of the embodiment of Figure 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A call button arrangement designed according to this invention provides an 10 individual with tactile feedback that a desired call signal has been successfully received by a system controller, for example. An automated mover associated with the call button structure provides a tactile indication to the individual, which communicates to the individual that the desired call has been successfully placed.

An example call button assembly 20 is shown in Figure 1. The call button 15 assembly 20 is supported on a surface 22, such as a wall within a building adjacent a landing where an individual may gain access to an elevator car. A support plate 24 is secured to the wall structure 22 in a conventional manner. Call buttons 26 and 28 are manually manipulatable to indicate a desire to have an elevator car arrive at the landing and then travel in a selected direction. In this example, the call button 26 is 20 used to call for an elevator car that will travel upward. An indicator 30 is provided adjacent the call button 26 so that an individual knows which button to push depending on the desired direction of travel. In one example, the indicator 30 lights up upon successfully manipulating the call button 26 to place the desired call. Similarly, an indicator 32 is associated with the call button 28.

25 Figure 2 shows another call button assembly 20' which is particularly useful at an uppermost or lowermost landing within a building, for example. In this example, the call button 28 and indicator 32 are provided to indicate that the only possible direction of travel from the example landing is down.

Another call button assembly 40 is shown in Figure 3. This example 30 comprises a car operating panel having a passenger interface 42. A plurality of call buttons 44 allow an individual to indicate what floor to which they desire the elevator car to travel. A plurality of door control switches 46 are also useable to send a signal

indicating a desired door operation (i.e., hold the door open). An emergency call button 48 allows a passenger within the car to call for assistance in the event of some elevator system trouble, for example.

A variety of call button structures are useable within the scope of this
5 invention. One example arrangement includes a depressible button that requires some movement of a button surface to activate a switch that corresponds to sending a signal indicating the individual's intention such as having the elevator car travel to a specific floor level. In another example, the call button is capacitive and only requires physical contact with an individual's skin to send the call signal. In another example,
10 the call button is part of a touch screen.

Figures 4 and 5 schematically show one example call button assembly 50. A moveable member 52 is supported for movement relative to a housing 54. A responder 56, which is an automated mover in this example, is supported within the housing 54. The automated mover in one example comprises a vibrating motor such
15 as a pancake or coin type vibrating motor available from JinLong Machinery of New York. Those skilled in the art who have the benefit of this description will be able to select an appropriate device that will provide a tactile indication that is able to be sensed by an individual activating the call button.

A retaining ring 58 secures the housing 54 behind the mounting plate 24 in a
20 conventional manner. A finishing ring 60 cooperates with the retaining ring 58 and has a surface 62 that is received against the wall plate 24 to provide a finished look, for example.

As shown in Figure 5, an electrical connector 64 facilitates making a connection between an electrical terminal 66 on the automated mover 56 and the
25 elevator system controller 68. When an individual makes appropriate contact with a surface 70 of the moveable member 52, a signal is sent to the controller 68 indicating the desired call. In this example, once the controller 68 receives the call and determines that it can appropriately respond, the controller 68 sends a signal to the automated mover 56, which then causes movement of the moveable member 52 in a
30 manner that is tactilely recognizable by the individual contacting the surface 70.

In another example, the automated mover 56 provides the tactile indication once the surface 70 is manipulated. In this example, no signal from the controller 68 is required to actuate the automated mover.

In one example, the automated mover 56 comprises a vibrating motor that 5 vibrates the moveable member 52 relative to the housing 54. The vibrating motion of the moveable member 52 provides tactile feedback to the individual that the desired call has been placed and will be processed in due course. In one example, the moveable member 52 reciprocates along an axis relative to the housing 54 because of the motion of the vibrating motor 56. In another example, the moveable member 52 10 vibrates in more than one direction (i.e., back-and-forth and side-to-side) responsive to activation of the vibrating motor 56.

The preceding description is exemplary rather than limiting in nature. Variations and modifications to the disclosed examples may become apparent to those skilled in the art that do not necessarily depart from the essence of this invention. For 15 example, another type of tactile indication other than a vibratory motion may be used. The scope of legal protection given to this invention can only be determined by studying the following claims.

CLAIMS

We claim:

1. A device (20) for placing a call in an elevator system, comprising:
 - 5 a surface (70) that is manually touchable to indicate a desired call; and
 - a responder (56) that automatically provides a tactile confirmation of the desired call.
2. The device of claim 1, wherein the surface (70) is supported on a moveable member (52) that is manually moveable to indicate the desired call.
 - 10
3. The device of claim 2, wherein the responder (56) comprises an automated mover (56) that automatically moves the moveable member (52) to provide the tactile confirmation.
 - 15
4. The device of claim 3, comprising a housing (54) that supports the moveable member (52) such that the moveable member is manually moveable relative to the housing in at least one direction.
 - 20
5. The device of claim 4, wherein the automated mover (56) moves the moveable member (52) relative to the housing (54).
 - 25
6. The device of claim 4, wherein the automated mover (56) moves the moveable member (52) in a second direction relative to the housing (54).
 - 30
7. The device of claim 3, wherein the automated mover (56) comprises a vibrating motor.
8. The device of claim 3, wherein the automated mover (56) moves responsive to a manual manipulation of the moveable member (52).

9. The device of claim 3, including a controller (68) that determines when the moveable member (52) has been moved and the automated mover (56) moves responsive to the controller.
- 5 10. The device of claim 1, wherein the surface (70) is capacitive and the device provides a call signal responsive to human contact with the surface.
11. The device of claim 1, wherein the surface (70) is supported on a hall call button (26, 28) that is adapted to be placed on a selected surface in a building.
- 10 12. The device of claim 1, wherein the surface (70) is supported on a car operating panel (40) that is adapted to be placed in an elevator car.

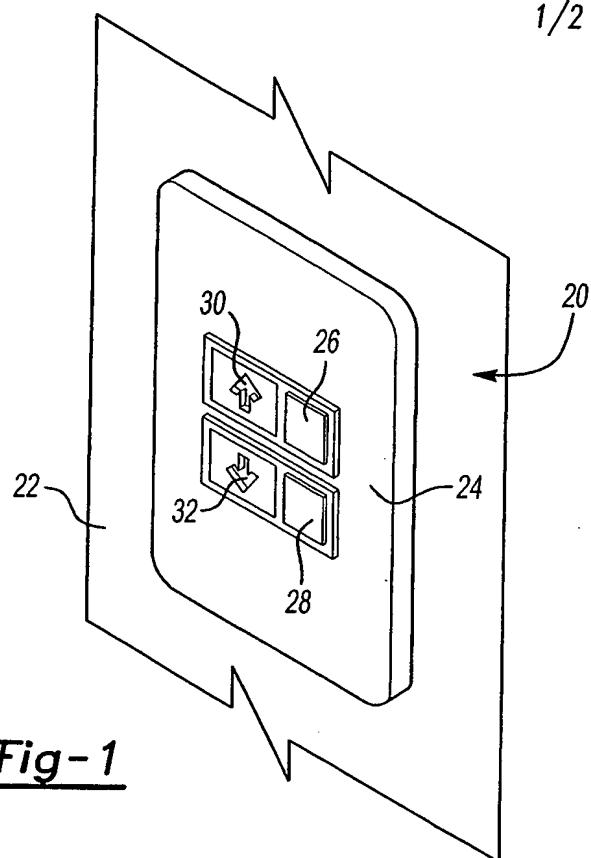
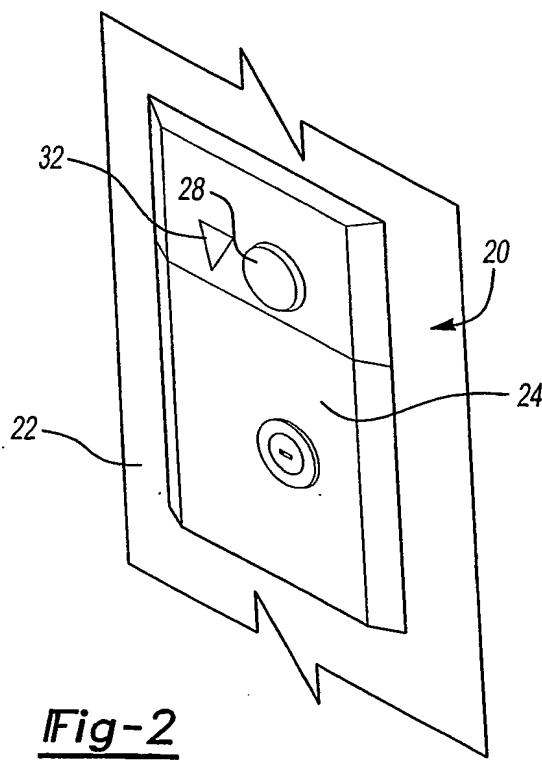
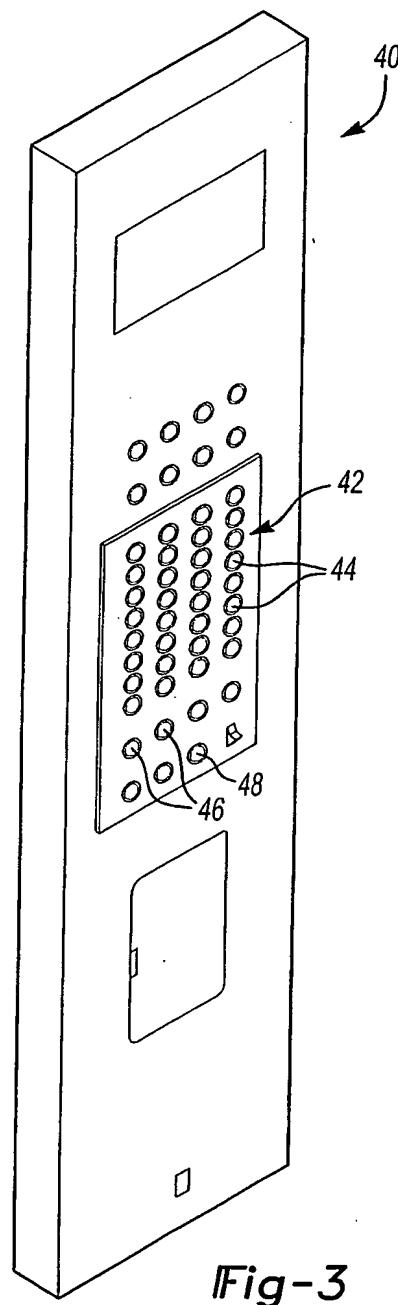
13. A method of acknowledging that a call button (26, 28, 44, 46) signal has been received in an elevator system, comprising:

5 providing a tactile confirmation at the call button (26, 28, 44, 46).

14. The method of claim 13, including automatically moving a surface (70) that is touched by an individual at least a portion of the call button (26, 28, 44, 46).

15. The method of claim 13, including vibrating at least a portion of the call 10 button (26, 28, 44, 46).

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Fig-1Fig-2Fig-3

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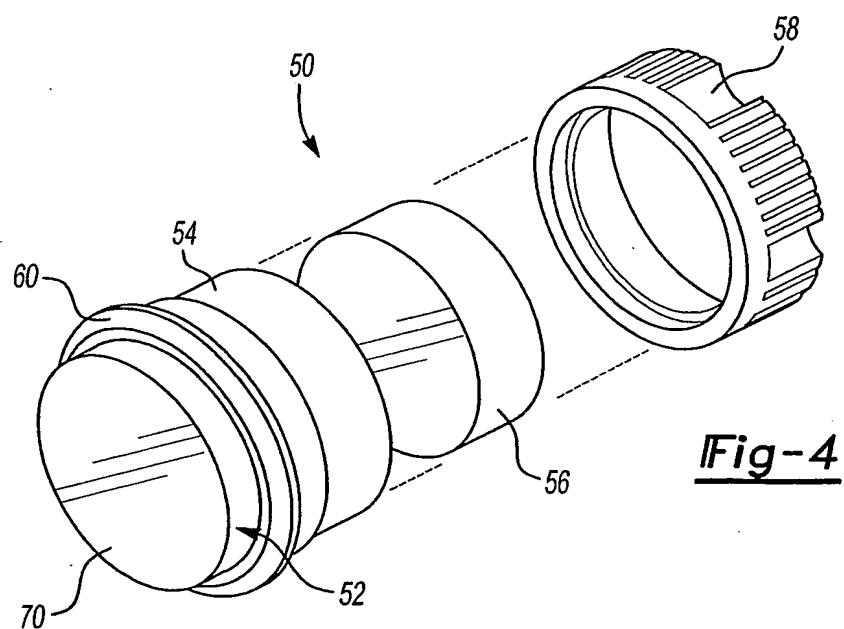


Fig-4

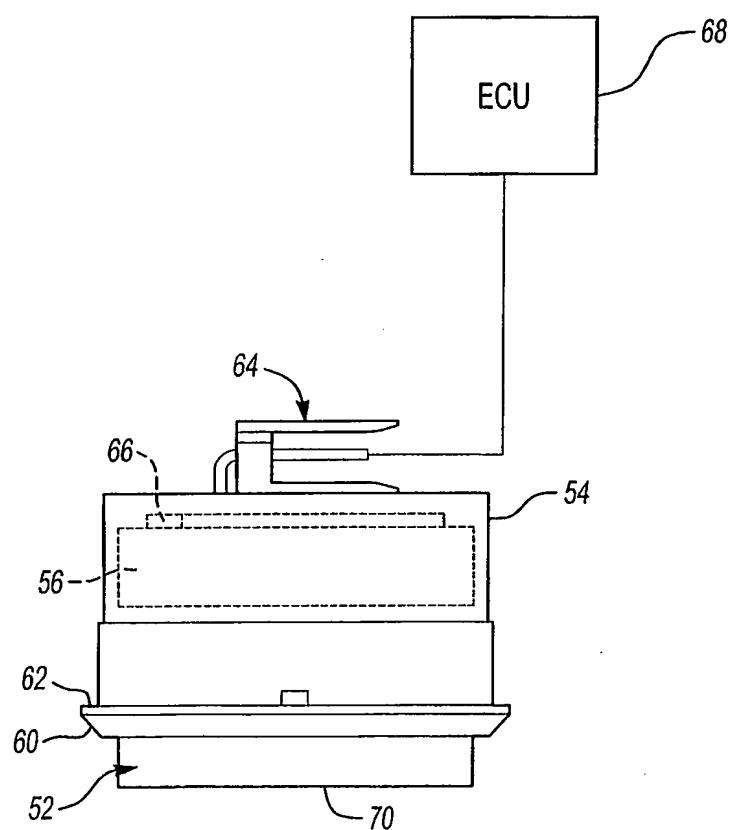


Fig-5

INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B66B 3/00
US CL : 187/ 391, 395; 340/ 999

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 187/ 391, 395; 340/ 999

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,239,726 B1 (Saida) 29 May 2001 (29.05.2001), see entire document.	1-15
A	US 5,497,149 A (FAST) 05 March 1996 (05.03.1996), see figure 3.	1
A	US 5,990,432 A (KURODA) 23 November 1999 (23.11.1999), see entire document.	1-15

Further documents are listed in the continuation of Box C.

See patent family annex.

Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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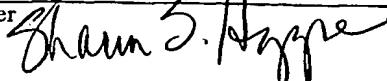
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